ORIGINAL RESEARCH

14. Occupational Exposure to Blood / Body Fluid and Anxiety Among Final-Year Medical Students: The Result of the Curricular Gaps in Medical Education

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https://www.youtube.com/watch?v=hJIcIJ1w8oM&list=PLhqNq3xJClbafO0Y5bvBcgMmXpgzJxd44&index=5&t=3304s

Background: Occupational exposure to blood and body fluids (BBF) remains a significant hazard globally, with medical students being particularly vulnerable during clinical training. These exposures pose direct blood-borne pathogen transmission risk and considerable psychological sequelae, including anxiety. This study aimed to determine BBF exposure prevalence and characteristics among final-year medical students and investigate their association with anxiety levels, while identifying key contributing factors.

Methods: A cross-sectional study was conducted among 271 final-year medical students at Bursa Uludağ University Faculty of Medicine between January and February 2025, achieving a response rate of 74.9% (n=203). Data were collected via a structured online questionnaire comprising three sections: sociodemographic characteristics, a detailed assessment of occupational BBF exposure history (including frequency, route, procedure, clinical department, and contributing factors), and the Turkish version of the Generalized Anxiety Disorder-7 (GAD-7) scale, a validated self-report tool for anxiety screening. Statistical analysis involved descriptive statistics, bivariate comparisons (Chi-square, t-test), and multivariate Negative Binomial Regression.

Results: More than half of the participants (56.2%, n=114) reported at least one BBF exposure during their clinical internships, with the majority (67.5%, n=77) experiencing multiple (≥2) incidents. Among the reported exposure routes, cutaneous contact was the most frequent (23.6%), followed by percutaneous injuries (12.8%). Exposures occurred most frequently during venous blood draws (50.0%) and arterial punctures (33.3%). Rotations in the Emergency Department were associated with the highest proportion of exposures (66.7%). While glove usage was universal during reported exposures (100%), adherence to other personal protective equipment (PPE) was low (masks: 58.8%, gowns: 16.7%). The leading self-reported contributing factors were intense working hours (31.6%), pressure from assistants (21.9%), and inexperience (20.2%). The overall prevalence of anxiety (GAD-7 score ≥5) was 50.2%. Students who experienced a BBF exposure had a significantly higher mean GAD-7 score (7.21±5.38) compared to their unexposed peers (5.39±5.15; p=0.016). Multivariate regression analysis confirmed that BBF exposure itself was a significant predictor of higher anxiety severity (p<0.001), equivalent to a 2.1-point increase in the mean GAD-7 score. Rotations in high-risk departments (Emergency Medicine and General Surgery) further amplified this risk (p<0.001). Notably, psychosocial factors such as performance anxiety (p<0.001) and pressure from assistants (p<0.001) demonstrated even stronger associations with anxiety severity than the physical exposure event.

Conclusion: BBF exposure is highly prevalent among final-year medical students and is significantly associated with increased anxiety levels, creating a dual burden. The high rate of recurrent exposures and inadequate PPE use beyond gloves, especially in high-acuity settings like the Emergency Department, points to critical gaps in current occupational safety training and practice. The findings highlight that psychological factors, including hierarchical pressure and performance anxiety, are potent contributors to both the risk of exposure and subsequent anxiety, suggesting a stress-injury cycle. There is an urgent need to evolve beyond traditional didactic training towards integrated, resilient protocols that combine enhanced, stress-inoculated simulation-based procedural training, strict enforcement of comprehensive PPE use, and embedded psychological support systems within the medical curriculum to safeguard both the physical and mental well-being of future physicians.

Table 1. Multivariate Negative Binomial Regression for Anxiety Severity (GAD-7 Scores)

Predictor	IRR	95% CI	p-value
Blood/Body Fluid Exposure	1.34	[1.18, 1.52]	<0.01**
High-Risk Department*	1.52	[1.29, 1.80]	<0.01**
Contributing Factors (Ref: Inexperience)			
Fatigue	1.18	[0.94, 1.48]	0.15
Long Working Hours	1.42	[1.13, 1.78]	0.01**
Pressure from Assistants	1.61	[1.27, 2.04]	<0.01**
Performance Anxiety	1.85	[1.32, 2.60]	<0.01**
Time Management Issues	0.97	[0.72, 1.31]	0.84
Anxiety Level	1.92	[1.15, 3.22]	0.01*
Age	0.99	[0.97, 1.02]	0.54
Gender (Female)	0.98	[0.83, 1.16]	0.82

Legend: High-risk departments: Emergency Medicine and General Surgery. Model Fit: Log-likelihood = -438.7, AIC = 901.4; **p<0.01, *p<0.05

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